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REVIEW OF SOVIET MOTOR TRANSPORT, 1924 - 1948

L. A. Bronshteyn, F. N. Budrin

On 7 November 1924, the first ten Soviet AMO automobiles passed through Red Square. Five years later, in 1929, construction was started on the Gor'kiy Automobile Plant imeni Molotov. A gigantic plant, the Automobile Plant imeni Stalin, was built with the AMO plant in Moscow as a basis, and a large plant to produce heavy trucks was built with an automobile repair shop at Yaroslavl' as a basis.

By 1932, the USSR had produced about 25,000 motor vehicles. During the first Five-Year Plan, 57,000 automobiles were produced and during the second Five-Year Plan, automobile plants produced 555,300 units. In 1938, Soviet automobile plants produced 211,000 motor vehicles, 184 of which were trucks.

During World War II, an automobile plant (Mias-ZIS) was built in the Urals and construction was begun on a large automobile plant in the Volga region.

By the end of 1940, the USSR had twice as many trucks as Germany, 1.5 times as many as France, and 1.4 times as many as Great Britain. In 1939, the millionth automobile was produced in the USSR.

In number of trucks, the USSR was second in the world even before the war and trucks were used in the USSR 2 - 2.5 times more than in the United States. The following table shows a comparison between the USSR and the United States in the use of trucks before the war.

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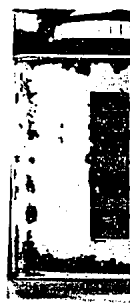


	USSR	USA	Comparison of USA With USSR (percent)
Annual vehicle run (kilometers)	40,000	18,000	45
Freight turnover per unit (tons per year)	1,490	542	36
Average carrying capacity of vehicle (tons)	2.1	1.4	67
Annual output for one machine-ton (tons)	705.5	385	52
Average hauling distance (kilometers)	10.4	28.2	270
Truck performance (ton-kilometers per year)	15,500	15,300	99.8

Of the 500,000 automobiles to be produced in the last year of the postwar Five-Year Plan, 428,000 will be trucks, 65,600 passenger cars, and 6,400 busses.

By the end of 1950, the motor-vehicle fleet of the USSR will be double that of the prewar period and the volume of hauling will increase 2.2 times in tons and nearly 3 times in ton-kilometers over 1940. Motor transport will haul almost 2.5 times more freight (in million tons) than all other types of transport combined. The total freight turnover for all types of freight will increase from 483 billion ton-kilometers in 1940 to 657.5 billion ton-kilometers in 1950, or 36 percent. This will represent an increase of 28 percent for rail, 38 percent for water, and 185 percent for motor transport.

By the end of 1950, the operating expenses of motor transport, which even before the war were almost 90 percent of those of railroads, will surpass those of all other means of transport.

Considerable funds are being appropriated during 1946 - 1950 for the reorganization of automobile transport and for the construction of modern roads. The network of modern main highways within the Soviet Union will be increased by 11,500 kilometers.

The concrete objectives of the postwar Five-Year Plan regarding motor transport are: to double the size of the motor-vehicle fleet over that of the prewar period; to increase the use of diesel engines, higher compression gasoline engines, gas-cylinder, and gas-generating vehicles capable of operating on local types of fuel; to increase the number of self-unloading trucks; to establish common-carrier hauling enterprises; to make wider use of trailers and containers in hauling freight; to increase production of garage tools and equipment; and to relieve the rails of short-distance freight hauling. The gas-generating vehicles are to be used extensively in lumbering operations and in agriculture, while city and suburban rolling stock is to increase by the addition of gas-cylinder vehicles.

In test runs over the Moscow-Leningrad and Moscow-Gor'kiy routes, truck and trailer combinations showed a higher performance and burned less gasoline per ton-kilometer than did single trucks. The performance of truck-trailer combinations over good suburban roads is 70-80 percent higher than that of single trucks, while gas consumption at slightly reduced speeds is 30 percent less per ton-kilometer.

In addition to trailers, production of 7- and 10-ton semitrailers has been approved. These vehicles are shorter, lighter, and easier to maneuver than the full trailers and cost considerably less to produce. The semitrailers can be produced along with the truck tractors, which are modified ZIS-150 and YaAZ-200 truck chassis, although the 1-PP-7 semitrailers can also be operated with the ZIS-5 truck tractor.

The one- and 2-ton single-axle trailers 1-P-1 and 1-P-2, contemplated for production in the near future, will be operated with modified GAZ-51 and ZIS-5 trucks as tractors.

The 2-, 4-, and 6-ton two-axle trailers are the principal types of trailers used to meet the demands of the national economy and of the Soviet Army.

The 1-PR-1.5, 1-PR-3, 1-PR-5, and 2-PR-10 trailers are designed for hauling extra long freight. With the exception of the 2-PR-10, all are of single-axle construction. As in the case of the other type single-and double-axle trailers, it is possible to use standard parts in these trailers, thereby reducing their production costs.

The following average truck speeds in kilometers per hour were established on 12 April 1941:

City Driving

	Without Trailer			With Trailer		
Type of Road	GAZ	ZIS	YaG	GAZ	ZIS	YaG
Moscow city streets	19	18	17	16	15	14
1st class roads	20	19	17	18	17	15
2d class roads	20	19	17	18	17	15
3d class roads	18	16	14	16	14	12
4th class roads	16	14	12	14	12	10

Noncity Driving

	Without Trailer			With Trailer		
Type of Road	GAZ	ZIS	YaG	GAZ	ZIS	YaG
Moscow city streets	27	25	23	19	18	17
1st class roads	32	28	26	24	20	16
2d class roads	30	26	24	21	18	15
3d class roads	24	20	16	18	16	14
4th class roads	16	12	12	14	10	10

In the above tables, GAZ includes all 2.5-ton trucks, ZIS includes 2.5-5-ton trucks, and YaG includes all trucks over 5 tons.

In Moscow, city traffic is considered traffic not only within the city limits but also within a radius of 20 kilometers of the Inner Belt Line; in Leningrad, city traffic includes 10 kilometers around the city. In other cities, city traffic is defined as within the limits of the city.

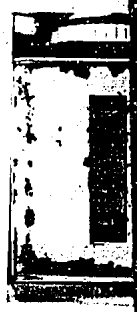
The speed norms are reduced one class in the case of intraplant haulings of the large plants and in the case of freight which requires special care in hauling, such as acids, inflammable materials, wine, and freight hauled in large containers. In short, for continuous runs of one kilometer or less, the speed norm is reduced 30 perc[illegible].

The following table shows the classification of roads, giving the type and condition of surface:

Classification	Surface	Condition of Surface
1st class	Asphalt-concrete	In good repair
	Concrete	" " "
	Stone blocks	" " "
	Tar	" " "
	Clinker brick	" "
	Blockwood	" " "
	Ice	" " "
2d class	Cobblestone	In good repair
	Crushed stone	" " "
	Earth	Rolled and smooth
3d class	Cobblestone	In poor condition or covered with a layer of mud up to 5 cm
	Crushed stone	In poor condition or covered with a layer of mud up to 5 cm
	Earth	Poorly rolled or lightly covered with mud
4th class	Packed snow	Dry, passable, covered with loose snow or mud layer up to 10 cm
	Earth	Dry, passable, covered with loose snow or mud layer up to 10 cm

The following norms for loading and unloading different types of freight were established 12 April 1941. The time is given in minutes required to load and unload a full truck.

Truck Capacity	Freight	Mechanized Operations		Liquids	Manual Loading-Unloading		
	Type	A	B	C	D	E	F
2 tons or less	I	9	15	--	18	--	--
	II	10.5	18	--	21.5	26	32
	III	12	21	24	24	30	38
	IV	15	24	31.5	31.5	40.5	48
	V	17	28	36	36	45	53
2-3.5 tons	I	14	20	--	24	--	--
	II	16	24	--	29	35	43
	III	18	26	32.5	32.5	40	50
	IV	22	31	42	42	54	64
	V	25	36	48	48	60	72
Over 3 tons	I	20	24	--	30	--	--
	II	22	29	--	36	43.5	54
	III	24	33	40.5	40.5	50	62
	IV	30	37	52.5	52.5	67.5	79
	V	33	42	60	60	75	88



A - Truck loaded with scoop shovel, unloaded by hand.

B - Dump truck loaded by manual labor; unloaded by dumping.

C - Petroleum products and other liquids hauled in tanks.

D - Freight is thrown on and off truck.

E - Freight is stacked on truck; unloaded by throwing off.

F - Stacking in loading and unloading.

In the hauling of grain, vegetables, construction materials, and products which have a tendency to stick to the body of a dump truck, the following norms in minutes were established 12 April 1941 for loading and unloading dump trucks:

Method of Loading and Unloading	Carrying Capacity								
	2 tons			2-3.5 tons			Over 5 tons		
	I	II	III	I	II	III	I	II	III
Loading by power shovel; unloading by dumping	10	12	14	11	13	15	14	16	18
Loading into bins; unloading by dumping	9	10.5	12	10	12	14	13	15	17

I - Construction materials (sand, earth, gravel, stone, crushed stone, cobblestone), grain, vegetables

II - Sticky products like clay and other raw materials which partially freeze or cannot be removed from dump truck body easily.

III - Sticky products like asphalt, concrete, and lime paste.

To eliminate returning empty truck runs, the Ministry of Automobile Transport RSFSR established the Avtotek (Office for Expediting Automobile Transport) in 55 krays, oblasts, and autonomous republics. This office unites about 700 motor stations, agencies, and dispatching and control points which have control over 200 roads and highways of all-union, republic, oblast, and local importance.

From 1940-47, organizations of the Ministry of Automobile Transport RSFSR made effective use of 2.1 million returning empty truck runs and hauled about 9.5 million tons of freight. In addition, these vehicles hauled more than 5 million passengers. This utilization of empty runs freed nearly 150,000 railroad cars for other uses. In 1947, in Moscow and Moskovskaya Oblast alone, returning trucks hauled 277,000 tons, which is equal to 10,000 railroad carloads.

To provide passenger service, the Ministry of Automobile Transport RSFSR is establishing bus service in 335 cities and taxi service in 150 cities. In 1947, the ministry's busses hauled 37.6 percent more passengers than in 1946. In 1950, the ministry's motor transport organizations will haul more than a billion passengers. Excluding Moscow and Leningrad, the number of cities with bus service doubled between 1945 and 1947 and the bus-line network also doubled. Freight taxi service has been established in 135 of the 150 cities contemplated in the 1946 - 1950 Five-Year Plan.

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The operation and repair of vehicles in many motor pools is still carried out by methods which do not meet present-day demands. New technology is introduced slowly; production of new garages and repair equipment is not being expanded. The automobile production plants do not provide the motor pools with a sufficient supply of stock parts. According to estimates of the TsNIIAT (Central Scientific Research Institute for Automobile Transport), the total labor involved in a motor pool with 50 vehicles for all types of maintenance and repair is approximately 5.2 man-hours per 100 driven kilometers, or, on an average, about 1600 man-hours (200 man-days) per truck a year.

To organize the operation, maintenance, and repair of new model vehicles more properly, plants of the Ministry of Automobile Transport RSFSR are doubling their production of garage equipment during the postwar Five-Year Plan. The Ministry of Automobile Transport RSFSR established in 1947 the following norms for first and second inspection checkups:

	First Checkup	Second Checkup
Passenger cars, all models	600-800	6,000-8,000
Trucks, all models	300-500	1,500-2,500
Busses, all models	400-600	4,000-6,000

Norms for use of tires and tubes were established 19 May 1940 by the Council of People's Commissars USSR. The following table gives the norms, in kilometers, for tires and tubes of domestic production.

Type of Tire and Tube	Kilometrage	
Casings and tubes for passenger cars, trucks, busses		
"Gigant" type	30,000	High pressure
Ordinary	21,000	" "
Third-grade casings and tubes for above vehicles		
"Gigant" type	27,000	High pressure
Ordinary	18,000	" "

Vehicles included in the 21,000-kilometer group are the GAZ-AA, GAZ-M-1, GAZ-M-415, ZIS-101, ZIS-110, GAZ-M-20, and Moskvich. Those in the 30,000-kilometer group are the GAZ-51, ZIS-5, ZIS-8, ZIS-16, ZIS-150, YaG-6, YaS-3, and YaAZ-200.

These norms can be reduced 10 percent for vehicles working under special conditions, such as at construction sites and quarries which have no normal approaches; on gravel and marshy roads; on mountain sections with inclines, declines, and curves; in high-temperature regions; in sandy areas (Tadzhik SSR, Turkmen SSR, Uzbek SSR); and in hauling of petroleum, kerosene, grease, and other petroleum products.

Results achieved by more advanced motor pools and Stakhanovite drivers in effecting savings in the use of fuel and lubricants and increasing tire mileage have made it possible to establish new graduated norms for tire and gas consumption. The Ministry of Automobile Transport RSFSR on 13 July 1948 increased the above norms for "Gigant" tires from 30,000 kilometers to 35,000 kilometers, and for ordinary tires from 21,000 kilometers to 25,000 kilometers.

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